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ABSTRACT

Some students are excluded from the National Education Longitudinal Study of 1988 (NELS:88) because of an inability, whether due to physical, mental, or linguistic barriers, to participate in studies requiring questionnaire or cognitive test completion. The implications of this exclusion for sample representativeness, national estimation, and policy studies are examined. Also described is a special study undertaken in the NELS:88 First Follow-Up to compensate in key respects for undercoverage bias related to such exclusion. The special study examined a subsample of 600 ineligible base-year eighth-grade students, collecting data on their enrollment status and demographic characteristics. Results obtained will allow calculation of a more accurate cohort dropout rate and will permit students who have become eligible (as through increased proficiency in English) to be taken into the study. Longitudinal studies similar to the NELS:88 must accommodate changes in eligibility as studies continue through 1992. In addition to a description of the NELS:88 and the Followback Study of Excluded 1988 Eighth Graders, recommendations concerning ways of reducing the numbers of excluded students are presented. Two figures illustrate the text. Four appendices provide the rationale and procedures for "sample freshening"; and exclusion criteria for the High School and Beyond Study of 1980, the National Assessment of Educational Progress of 1990, and the Base Year Ineligibles Study of the NELS:88 First Follow-Up. (SLD)

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The Problem of Excluded Baseline Students in a School-Based Longitudinal Study: Correcting National Dropout Estimates and Accommodating Eligibility Change Over Time

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The Problem of Excluded Baseline Students in a Longitudinal Study: Correcting National Dropout Estimates and Accommodating Eligibility Change Over Time

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Paper Presented at the Symposium on NELS:88 of the Longitudinal Research Special Interest Group, American Educational Research Association, Annual Meeting, Chicago, Illinois, April 6, 1991.

Abstract

This paper draws on the experience of NELS:88 in order to examine the implications for sample representativeness, national estimation, and for policy studies, of exclusion of students who are deemed ineligible by virtue of their inability--stemming from physical, mental or linguistic barriers--to participate in studies requiring questionnaire and/or cognitive test completion. It also describes a special study undertaken in the NELS:88 First Follow-Up to compensate in key respects for the undercoverage bias attendant upon exclusion of potential sample members. The special study examines a subsample of the ineligible base year students, collects data on their school enrollment status and demographic characteristics, and ascertains whether their eligibility status has changed. The special followback study of Base Year excluded eighth graders will make it possible to calculate a more accurate cohort dropout rate for NELS:88 eighth graders between 1988 and 1990, and will permit students who have become eligible in the meantime (e.g., through having become more proficient in English) to have a chance of re-selection into the study. Change in eligibility status must be accommodated by a longitudinal study such as NELS:88, which is designed to support nationally representative eighth (1988), tenth (1990), and twelfth grade (1992) student samples, as well as maintain the longitudinal eighth grade cohort.

This discussion is presented in six sections:

(1) an account of rules and procedures for exclusion of students in the NELS:88 Base Year;

(2) an assessment of how accurately the Base Year exclusion criteria were applied;

(3) a discussion of statistical problems associated with excluding students from the sample, in particular, both cross-sectional and longitudinal undercoverage bias;

(4) an account of the aims of the NELS:88 First Follow-Up Followback Study of Excluded 1988 Eighth Graders;

(5) an account of the implementation of the Followback Study; and

(6) recommendations concerning ways to reduce the number of students excluded from national studies; and, in terms of correction of estimates and accommodation of eligibility status change, the best means of incorporating baseline ineligible students in the subsequent waves of longitudinal studies.

In section 6, the following specific recommendations are made:

I. Special means (foreign language translations of questionnaires, one-on-one oral administrations, large print versions of survey forms, extended survey administration time) should in some cases be adopted, though the cost of special measures--both monetarily and in terms of school and individual burden and cooperation--must be carefully weighed against the gain in precision of estimates, taking into account the primary research and statistical reporting purposes of the study.

II. It is desirable to move toward more common eligibility definitions across major national studies, to increase the comparability of their findings. Nevertheless, the different purposes of these studies must also be taken into account. For example, a study such as NAEP will need to exclude certain students who cannot be tested, yet must, by a study like NELS:88, be included in terms of their school enrollment status and demographic characteristics, in order to generate a nationally precise cohort dropout rate.

III. The following particular steps should be taken by national education longitudinal studies: (a) define eligibility as inclusively as possible; (b) follow ineligible students to ascertain change in eligibility status over time; (c) gather demographic and school enrollment status data on both the excluded portion of the student population, and on all survey nonparticipants.

IV. The strategy of extending population coverage must go hand in hand with efforts to reduce unit and item nonresponse and to improve the quality of responses, since the rare policy-relevant populations most likely to be excluded are also disproportionately affected by measurement error owing to these other factors.

Introduction

In the base year of the National Education Longitudinal Study of 1988 (NELS:88), students were sampled through a two-stage process. First, stratified random sampling and school contacting resulted in the identification of the school sample; second, students were randomly selected (with oversampling of Hispanics and Asians) from within cooperating schools.

The target population for the base year comprised all public and private schools containing eighth grades in the fifty states and the District of Columbia. Excluded from the NELS:88 school sample are Bureau of Indian Affairs (BIA) schools, special education schools for the handicapped, area vocational schools that do not enroll students directly, and schools for dependents of U.S. personnel overseas. (For further details of school-level exclusion, see Spencer et al., 1990, p.10). The student population excludes students with severe mental handicaps, students whose command of the English language was not sufficient for understanding the survey materials (especially the cognitive tests), and students with physical or emotional problems that would make it unduly difficult for them to participate in the survey. The primary focus of this paper is (1) the consequences of student exclusion for the research design and the statistics it will generate, and (2) the special measures that have been undertaken in NELS:88 to compensate or correct for the effects of exclusion. Before either of these two topics is pursued in detail, however, it will be desirable to say more about student exclusion in the NELS:88 base year--the 1987-88 school year during which the eighth grade cohort was selected and surveyed.

1. **Exclusion of students.** To better understand how excluding students with mental handicaps, language barriers, and severe physical and emotional problems affects population inferences, data were obtained on the numbers of students excluded as a result of these restrictions.

Seven ineligibility codes defining categories of excluded students were employed at the time of student sample selection:

A - attended sampled school only on a part-time basis, primary enrollment at another school.

B - physical disability precluded student from filling out questionnaires and taking tests.

C - mental disability precluded student from filling out questionnaires and taking tests.

D - dropout: absent or truant for 20 consecutive days, and was not expected to return to school.

E - did not have English as the mother tongue AND had insufficient command of English to complete the NELS:88 questionnaires and tests.

F - transferred out of the school since roster was compiled.

G - was deceased.

Before sampling, school coordinators--members of the school staff, typically an assistant principal or guidance counselor who acted as liaison between the school and the study--were asked to examine the school sampling roster and annotate each excluded student's entry by assigning one of the exclusion codes. Because eligibility decisions were to be made on an individual basis, special education and Limited English Proficiency (LEP) students were not to be excluded categorically. Rather, each student's case was to be reviewed to determine the extent of limitation in relation to the prospect for meaningful survey participation. Each individual student, including LEPs and physically or mentally handicapped students, was to be designated eligible for the survey if school staff deemed the student capable of completing the NELS:88 instruments, and excluded if school staff judged the student to be incapable of doing so. School coordinators were told that when there was doubt, they should consider the student capable of participation in the survey. Exclusion of students after sampling ("post-roster ineligibles") occurred either during the sample update just prior to survey day, or on survey day itself. Such exclusion after sampling normally occurred because of a change in student status (for example, transfer, death). However, in rare instances such exclusions reflected belated recognition of a student's pre-existing ineligibility--that is, if an annotation error was made and an ineligible student selected for the sample in consequence of such an error, ineligibility became apparent later in the survey, whereupon the student was excluded.

Excluded students were divided into those who were full-time students at the school (categories B, C, and E) and those who were not (categories A, D, F, & G). Our main concern here is with students who were full-time students at the school but who were excluded from the sample. Excluding these students will affect estimates made from the sample.

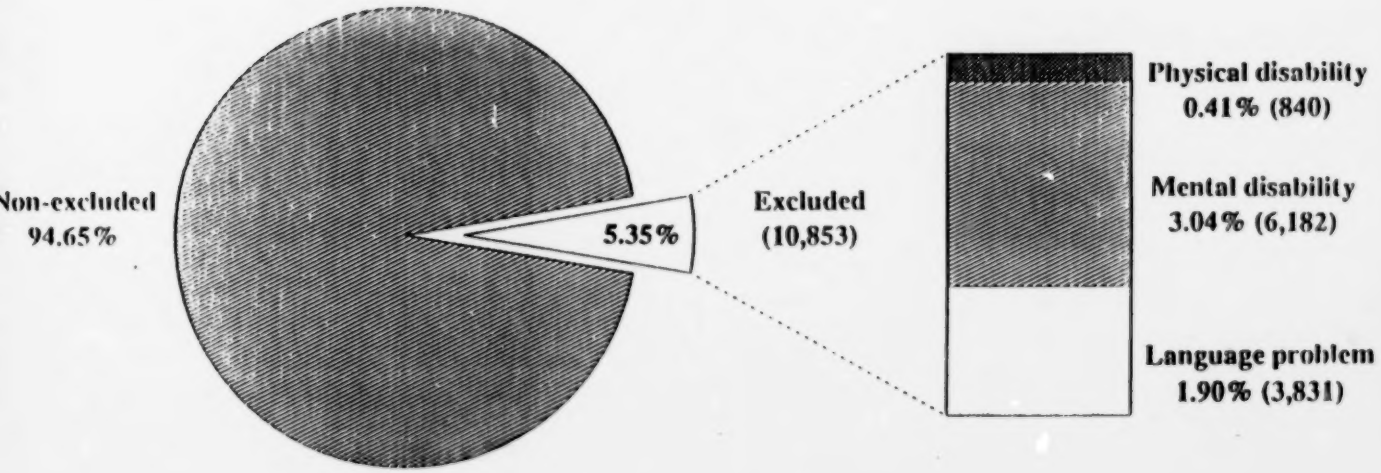
Students in categories A (n=329), D (n=733), F (n=3,325), and G (n=6) were either not at the school or were present only part time (with primary registration at another school, hence a chance of selection into NELS:88 at another school). Thus excluding students in these categories has no implications for making estimates to the population of eighth grade students.

It should be noted that students in category F, those who had transferred out of the sampled school, had some chance of being selected into the sample if they transferred into another NELS:88 sampled school just as transfers into NELS:88 schools from non-NELS:88 schools had a chance of selection at the time of the sample update. The sampling of transfer-in students associated with the sample update allowed us to represent transfer students in the NELS:88 sample.

Figure 1 gives the number and percentage of students who fall into each of the three exclusion categories (B, C, and E) that may have implications for estimates drawn from the base year sample and subsequent study waves.

The total eighth grade enrollment for the NELS:88 sample of schools was 202,996. Of these students, 10,853 were excluded owing to limitations in their language proficiency or to mental or physical disabilities. Thus 5.35 percent of the potential student sample (the students enrolled in the eighth grade in the 1,052 NELS:88 schools from which usable student data were obtained) were excluded. Less than one half of one percent of the potential sample was excluded for reasons of physical or emotional disability (.41 percent), but 3.04 percent was excluded for reasons of mental disability, and 1.90 percent because of limitations in English proficiency.

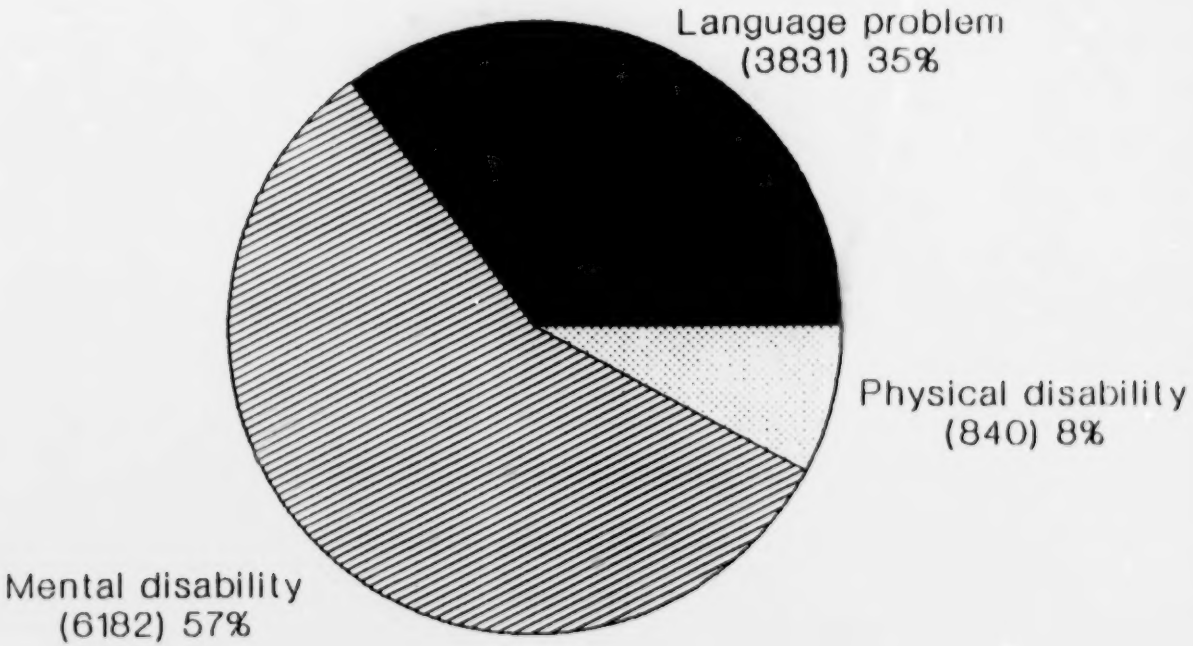
Figure 1.--Excluded and non-excluded eighth grade students in NELS:88 base year schools



N = 202,996 (Total number of eighth grade students enrolled in 1,052 participating schools.)

Figure 2

Excluded Students
NELS:88 Base Year Schools



N=10,853

Put another way (see Figure 2, above), of the 10,853 excluded students, about 57 percent were excluded for mental disability, about 35 percent owing to language problems, and less than 8 percent because of physical or emotional disabilities. Because current characteristics and probable future educational outcomes for these groups may depart from the national norm, the exclusion factor should be taken into consideration in generalizing from the NELS:88 sample to eighth graders in the nation as a whole. This implication for estimation carries to future waves. For example, if the overall propensity to drop out between the eighth and tenth grades is twice as high for excluded students as for non-excluded students, the dropout figures derivable from the NELS:88 First Follow-Up (1990) study would underestimate early dropouts by about ten percent.

In a school-based longitudinal survey such as NELS:88, excluded students carry a second implication for future waves, in addition to their possible impact on estimation. To achieve a thoroughly representative tenth grade (1990) and twelfth grade (1992) sample comparable to the High School and Beyond 1980 sophomore cohort (or, for 1992, the HS&B 1980 senior cohort and the base year of NLS-72), the follow-up samples must approximate those which would have come into being had a new baseline sample independently been drawn at either of the later time points. In 1990 (and 1992) one must therefore freshen, to give "out of sequence" students (for example, in 1990, those tenth graders who were not in eighth grade in the spring of 1988) a chance of selection into the study. One must also accommodate excluded students whose eligibility status has changed, for they too (with the exception of those who fell out of sequence in the progression through grades) would potentially have been selected had a sample been independently drawn two years later, and must have a chance of selection if the representativeness and cross-cohort comparability of the follow-up sample is to be maintained. Thus, for example, if a base year student excluded because of a language barrier achieves the level of proficiency in English that is required for completing the NELS:88 instruments in 1990 or 1992, that student should have some chance of re-entering the sample. A substantial subsample of the base year ineligibles will, accordingly, be followed in the NELS:88 first and second follow-ups, to reassess their eligibility status and gather information about their demographic characteristics, educational paths, and life outcomes. Data on persistence in school to be obtained from this subsample will be used to derive an adjustment factor for national estimates of the eighth grade cohort's dropout rates between spring of 1988 and spring of 1990, and later, between 1990 and 1992. If the excluded student sample is followed after 1992, the resulting information will further enhance the generalizability of NELS:88 data in determinations of how many dropouts eventually gain high school diplomas or equivalency certificates and by what route.

Of course, this special followback study of base year ineligibles does not wholly compensate for population undercoverage because students who are educated at home or in private tutorial settings, those who are in excluded categories of schools, and those who have dropped out of school before reaching the eighth grade, also fall outside the NELS:88 base year sample. The size of the pre-Grade 8 dropout population in winter-spring 1988 is uncertain. The National Center for Education Statistics has reported that 12 percent of dropouts ages 16-24 in 1988 had completed six or fewer years of school (Frase, 1989). However, over 31 percent of Hispanic dropouts age 16-24 had completed only six, or fewer, years of schooling. This finding both confirms the fact that there is a sizable group of students who leave school before entering eighth grade, and suggests that the biasing effect of this phenomenon on NELS:88 data may be much more pronounced for some subgroups (in particular, Hispanics) than others.

2. Statistical Problems Associated with Excluding Students from the Sample.

Excluded students are a problem for multiple reasons. Excluded students may be a source of bias in national estimates both overall and in particular for certain groups. This problem appears both cross-sectionally, when one attempts to generalize from 1988 NELS:88 base year data; and longitudinally, when one attempts to measure cohort change more broadly (for example, to estimate a national dropout rate) or when one tries to achieve nationally representative tenth and twelfth grade student samples.

Cross-Sectional Sample Undercoverage Bias. Estimates for key policy-relevant subgroups and sampling strata may be disproportionately affected by ineligibility. Exclusion rates vary, geographically and by urbanicity and by school type and by race and gender--males tend to be excluded more than females; language minority students (hence Asians and Hispanics) and blacks are excluded at a higher rate than are whites; substantially more students are excluded in public schools than in private schools, and most particularly in public school systems with large immigrant populations. The impact of exclusion on the generalizability of data is well illustrated by the case of students who are classified as of limited English language proficiency (LEPs). We estimate that about half of the potential LEP students who could have fallen into the sample were excluded. Indeed, the LEPs who were declared ineligible are precisely those with the more severe limitations in English, hence those targeted by intervention programs and of the most pressing policy interest.

Longitudinal Sample Undercoverage Bias. It should be remembered that NELS:88 attempts not only to follow a longitudinal sample over time, but to augment the longitudinal sample at two time points (1990 and 1992) in order to achieve nationally representative tenth and twelfth grade samples. If any of the reasons for exclusion are based on individual states that may change over time, the representativeness of the tenth and twelfth grade samples will be compromised if 1987-88 eighth graders who have overcome their barrier to participation in the meantime are given no chance of reselection into the study.

The potential impact of exclusions on change estimates can be readily illustrated. The phenomenon of dropping out prior to school completion offers one of several possible examples. Generally, three kinds of dropout statistics are critically important: event dropout rates (the proportion of students who leave school prior to completion in a single year); status dropout rates (the proportion of the population who have not finished high school, viewed at a particular time point); and cohort dropout rates (statistics derived from following a cohort over time to determine who drops out, when they drop out, which dropouts return to school and when). (For a detailed discussion of types of school retention and dropout rates, see Frase 1989). Each of these dropout rate calculations is valuable for different purposes; however, application of dropout rates for national estimation has sometimes been problematic, given the lack of consistency in local and state dropout definitions, and the varying quality of the records data available (see, e.g., Frase 1989, App.D). The Current Population Survey (a nationally representative cross-sectional household study), and longitudinal studies such as High School and Beyond (HS&B), have therefore been of particular importance in obtaining national dropout statistics. The modest sample size of the Current Population Survey, however, limits the precision of estimates for some of the policy-important minority subpopulations (Kaufman and Frase, 1990, p.30). And there are limitations to the HS&B data as well, some of which may be overcome by NELS:88.

One weakness in the High School and Beyond design was that it began with second semester tenth graders; many students drop out before reaching tenth grade. NELS:88 will correct this design weakness by beginning with eighth graders. HS&B also excluded certain categories of students: those who dropped out in the course of tenth grade, those with language barriers to participation or with physical or mental barriers to participation. These excluded students do not enter into the cohort dropout rate obtained from HS&B. NELS:88 will correct this HS&B design weakness too through a followback study of excluded NELS:88 base year students.

NELS:88 employs an event history definition of dropping out (the survey collects the time of the event of dropping out) and repeatedly returns to the same individuals to update their event histories. It is therefore possible to determine both who drops out and who returns to school, and at what stage; and to eventually know what proportion of dropouts within the defined cohorts (a representative sample of 1987-88 eighth graders; a representative sample of 1989-90 tenth graders) obtain high school diplomas or their equivalents. NELS:88 provides both a particularly strong basis for investigating the dynamics of school leaving and school completion, as well as a basis for estimating the cohort dropout rate for 1987-88 eighth graders.

However, the probable understatement of dropout rates and loss of representativeness to the dropout sample attendant upon the three categories of base year student sample exclusions must be taken as a serious consequence of having incomplete (95 percent) representation in NELS:88 of the 1987-88 eighth grade population. Subgroup estimates may be particularly affected. For example, exclusion owing to language barrier may particularly affect groups with high recent immigration rates to the United States, including many Hispanic and Asian subgroups. Additionally, excluded members of the subgroup are likely to differ in important respects from included members. Thus, for example, Bean and Tienda report (1983) that it is precisely those Hispanics with lesser English language proficiency who are least likely to complete high school.

The excluded students pose, moreover, a double difficulty for future rounds. First, any undercoverage bias introduced in the Base Year will persist in subsequent rounds of the study.

Second, sample freshening[1] alone is not sufficient to ensure a

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[1] In order to compensate for differences between the 1988 eighth grade cohort and the tenth and twelfth grade student population frames in 1990 and 1992 --and thus ensure full tenth and twelfth grade sample representativeness--two logically related subsets of students must be taken account of. First, as noted above, the longitudinal cohort of 1988 eighth graders must be augmented by representatives of the population of base year ineligible students who change in their characteristics such that they meet NELS:88 eligibility criteria in tenth or twelfth grade. Second, one must find the means to sample and collect data from the subset of 1990 tenth graders who were not enrolled as eighth graders in American schools in 1988. There are, broadly, two types of students who belong to this subset, (1) individuals who have not changed grades in "normal progression" (those who were held back a grade or skipped a grade) and (2) those who were out of the country, such as recent immigrants. The freshening population, like the ineligibles population, will prove to have special

representativetenth grade sample (1990) and twelfth grade sample (1992). If any of the bases for exclusion implicate statuses that are potentially transient, then the NELS:88 First Follow-Up and Second Follow-Up samples will be less than fully representative to the extent that excluded categories of eighth graders whose statuses are subject to change are given no chance of reselection into the sample.

3. How Well Were the Base Year Exclusion Criteria Applied?

It is important to keep in mind that the excluded students were determined by their schools to be unable to participate. Criteria for exclusion were provided to the schools, but it was up to the school itself--usually the School Coordinator or the principal--to interpret and apply the eligibility criteria. Schools were asked to apply the criteria on an individual basis. Thus, LEP students or special education students were not to be excluded categorically. Rather, only those particular LEP or special education students whose limitations were so severe as to constitute significant barriers to meaningful participation were to be excluded. In cases of uncertainty, school personnel were asked to include the student.

A few students were included who manifestly should not have been. Their difficulty in completing the questionnaires and tests was noted by survey administrators, and Educational Testing Service rejected as unusable a small number (less than one percent) of cognitive tests. However, in the main, the extreme cases of physical or mental disability, and limitation of English proficiency, were successfully excluded.[2] Indeed, one could draw the conclusion that the screening out of students was too effective in that one would expect more borderline cases had schools taken with full seriousness the injunction "when in doubt, include."

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characteristics and a high density of students from policy-relevant subgroups. (For example, not only do Hispanics constitute a significant proportion of immigrants, but also, a disproportionate number of Hispanic students fall outside the modal grade progression--De La Rosa and Maw, for example [1990, p. 18] cite 1988 CPS data that show that "over one third of Hispanic females have fallen one or more years behind (34.3%), as have more than three in seven Hispanic males (44.9%)"). The representativeness of the tenth and twelfth grade samples in NELS:88 has a double importance. Not only is such representativeness desirable to ensure the generalizability of cross-sectional findings, but also it will allow cross-cohort comparisons to be made to the previous NCES studies of high school sophomores (HS&B, 1980) and seniors (HS&B, 1980, 1982; NLS-72, 1972). For an account of sample freshening in NELS:88, see Appendix A.

[2]Completion rates were in excess of 99 percent for all tests. Sections were not scored if fewer than five items were answered in the section; most students in this group answered no items at all. Then a "reasonableness check" was performed to identify students with ten or fewer items answered and whose IRT-estimated scores were more than three points higher than their raw scores. Most deleted cases had zero items answered, and some of these cases could represent students who found the tests too difficult to attempt. The percentage of usable cases was 99.7 percent in reading and mathematics, 99.5 percent in science, and 99.2 percent in history/civics/social studies.

In any case of the application of general criteria, there is bound to be some degree of arbitrariness in judgments about borderline cases. This arbitrariness is of course compounded when the numbers of people (over a thousand individuals in the NELS:88 base year) rendering eligibility judgments is large. Our greatest concern about the classification process, however, is that, for reasons of time and burden, some schools apparently departed from their instructions and excluded students on a categorical basis in preference to rendering the prescribed case-by-case assessments. (Evidence for this phenomenon is seen when sampling rosters are inspected and all students within a pre-existing category are excluded.) In consequence of categorical exclusion, one would expect that overall, more students may have been excluded than necessary. The temptation to exclude categorically--in a school with a large eighth grade, given severe time pressures for producing an annotated roster, and with individual-level information available to the School Coordinator only through the laborious process of interviewing the special education or bilingual education teacher of each student--is large.

In order to minimize this problem in the future, one solution might be greater precision in exclusionary definitions. (This is the direction that NAEP moved in the 1990 assessment--see Appendix C for the 1990 NAEP criteria--with a modest but important impact on the number of ineligibles [the 1990 assessment saw a reduction in the excluded portion of the population of around one half of one percentage point]). Setting out more specific conditions for ineligibility would increase school burden and might adversely affect prospects for cooperation in a few cases, but in general would maximize the number of participants by minimizing the number of wrongful exclusions. In addition, giving schools the option of excluding students from the test while including them for purposes of questionnaire administration would further minimize excessive exclusion. Both these strategies--further interpreting the broad eligibility criteria, allowing questionnaire-only eligibles--have been pursued in the NELS:88 excluded student followback study that is described below.

4. The Followback Study of Excluded 1988 Eighth Graders: Aims.

The longitudinal followback of Base Year excluded students that undertaken in the NELS:88 First Follow-Up and to be repeated in the 1992 Second Follow-Up will help to realize several important aims.

First, it will help to increase the accuracy and generalizability of key population inferences. It will do so by providing a correction factor for NELS:88 estimates of school-leaving and school completion that encompasses virtually the entire population of 1987-88 eighth graders. By checking the school enrollment status of the special sample of excluded students, and by gathering additional demographic information, it will be possible to generate subgroup-adjusted correction figures for NELS:88 national estimates of the rates of remaining in school, dropping out, and dropping out and returning to school.

Second, in cases where an adjustment to estimates cannot be obtained, data from the study can serve to qualify estimates, that is, to enter an explicit caveat about their limitations. This will be the case, for example, with test results. By gathering basic demographic data on who was excluded, it will be known to what extent, both generally and for selected subgroups, test results place a probable upward limit on the tested achievement of in-school and out-of-school youth in the United States whom the NELS:88 sample was designed to represent. The biasing effects on test results are likely to be

especially severe for selected groups. For example, exclusion of English language non-proficient and the more severely limited English proficient students presents a biased picture of groups with high immigration rates (for example, Koreans), since generally recent arrivals--precisely those students most in need of special assistance and most likely to have low scores on a cognitive battery in English--will have been excluded from testing. Test results will therefore tend to paint a more optimistic picture of the educational progress of certain subgroups than may be justified. Likewise test results (and student, parent, school, and teacher data) will be lacking for a portion of the dropout population--the portion excluded from the sample. To the extent that excluding students lessens the representativeness of the dropout sample in NELS:88, it is important to know as much as possible about the demographic characteristics of excluded 1987-88 students who have since dropped out of school.

A third aim that will be served by the followback study will be to enhance the representativeness of the high school-based NELS:88 follow-up samples. Just as freshening is necessary to ensure sample representativeness (freshening gives a chance of selection to those 1990 tenth graders and 1992 twelfth graders who are out of sequence, that is, were not eighth graders in 1988), so too must one accommodate those whose ineligibility status changes over time. (Although technically one should also freshen on the excluded students, the monetary cost of doing so would be high and the payoff in sampling precision small.)

A fourth aim that will be served by the followback study of excluded eighth graders is to correct any errors in the application of past eligibility criteria. We noted above that there are probably some erroneous classifications, stemming from categorical exclusion of special education or bilingual education students by some schools. Revisiting these cases--particularly with a more precisely specified interpretation of the original eligibility definitions, and access to specialty teachers (bilingual education, English as a second language, special education) who have first-hand knowledge that would underwrite accurate individual-level eligibility determinations --would afford an opportunity to correct any such misclassifications.

A fifth and final aim of the study is to enforce consistency in eligibility definitions between the base year and follow-ups of NELS:88, by applying the broadened eligibility criteria of the First Follow-Up (which extended eligibility to students who could complete the questionnaire only in Spanish) to excluded 1987-88 eighth graders.

While demographic and status information should be gathered for all members of the excluded student followback sample, there are three situations which justify inducting a formerly excluded student into NELS:88 and administering the student questionnaire (and tests, if possible). The three situations are as follows: that person (1) has changed, that is, now meets the eligibility criteria; (2) was wrongly classified in 1988; (3) was rightly classified and the student's limitation is unchanged, but this person meets broadened eligibility criteria (that is, can complete the student questionnaire in Spanish).

The ineligibility issue carries with it a special twist to be confronted in the Second Follow-Up. Some freshened students from the 1990 sophomore sample were deemed ineligible, that is, unable to complete the various survey forms and therefore excluded from the NELS:88 First Follow-Up. Since the competence of these students may change between 1990 and 1992, as may that of Base Year (1988) ineligibles who remained ineligible in 1990, the target population for the 1992 follow-back of ineligibles will

comprise both the remaining Base Year ineligibles (those not added to the First Follow-Up sample in 1990) and the First Follow-Up ineligibles from the freshened sample.

5. The Followback Study of Excluded 1988 Eighth Graders: Implementation.

5.1. **Sampling.** The sample of ineligible students was drawn from the 1,052 fully participating Base Year core schools. Three types of ineligible students were sampled: physically handicapped (B), mentally handicapped (C), and language minority (E) students with a linguistic barrier to participation.

Each school folder contained a transmittal which gave the total number of ineligibles at each school. The folder also contained a school roster, on which, normally the ineligibles were crossed out, with a code entered next to their names to indicate the reason for exclusion. After finding the codes for those students, Transfer, Part-Time, and Dropout students were eliminated, and the remaining ineligibles sorted by ethnicity.

All of the students were numbered consecutively on the roster. If there were API (Asian/Pacific Islander) and/or HIS (Hispanic) students, they were numbered separately on the roster or on a special form for those groups. Next the ineligibles were listed and numbered on a counting form. This procedure was performed for each school.

The counting form was divided into three sections, NOT (non- API and non-HIS) API, and HIS. Students were listed by ethnicity only if it was specified on the school transmittal that the school had API or HIS students. Even if the surname was Hispanic or Asian, students were not reclassified if the roster and transmittal did not specify this information. (In a few instances ethnicity was not indicated on the roster; these students were then listed on the form as NOTs.) The list of students was then numbered, beginning with the next consecutive number following the last number used on the roster. For instance, if the number of NOTs was 286, the first ineligible NOT would be numbered 287 and so on. In essence these students were simply added to the bottom of the numbered roster. This numbering process was repeated for API and HIS students.

After the numbering process had been completed for a school, students were sampled using the school's original selection table, following the next unused number(s) on the table. If there were more students than selection numbers the number(s) were imputed for the next selection(s). Once the selections were made the names of the students were put into a spreadsheet file. There were 10,723 pre-roster ineligibles, of whom 1,479 were selected. The next step was to add the post-roster ineligibles to the group of pre-roster students; of the 130, 119 were selected. Merging the two files produced a sample frame of 1,598 students.

The file was sorted by ethnicity, eligibility, and pre-roster or post-roster type. A serpentine sort was then employed. The file was subsampled, using an interval of 2.37091 and a random start of 1.685831. A total of 674 students were sampled for the NELS:88 Ineligible Study. There are 623 pre-roster ineligibles and 51 post-roster ineligibles.

These students were included in the pool of ineligibles. Six hundred had originally been set as the target sample size. However, in 172 cases the reason for ineligibility was not recorded but the student's name was crossed off the roster. From previous information (such as callbacks to schools) we had reason to believe that most of these

were transfers, students in a different grade, or students who were expected but never appeared at the school. If so, these students would be eliminated once locating began, but it seemed prudent to follow up on these cases to make sure they were transfers or students never enrolled (in the school/in eighth grade), and not excluded students. Therefore NORC selected 674 = 600/(1- 172/1598) to achieve an ending sample size of 600.

5.2 **Instrumentation.** For all base year ineligibles in the excluded student followback sample, the following status information was to be obtained from the student's current school (if enrolled) or school last attended (if a dropout) upon screening:

Sex: male or female;

Race/ethnicity: white, black, Hispanic, Asian/PI, American Indian/AN, other

School enrollment status: dropout =
more than 20 consecutive unexcused absences between:

a. March 1, 1989 and March 31, 1990 **or**
b. April 1, 1990 and June 30, 1990

If a student was reported to be a dropout according to the above definition, confirmation was then to be obtained from the home. The reason for this is that school records sometimes incorrectly describe students who transferred out as dropouts. If the home indicates that the student did not drop out but transferred, and in fact is enrolled in another school, then further follow-up would take place with the newly identified school.

Students were next screened for eligibility. (This process is described in 5.3 below).

For students classified as still ineligible, no further information was collected, beyond locating data to facilitate future follow-up and a detailed description of the precise reason for continued (1990) ineligibility. For students deemed to be eligible, the First Follow-Up student questionnaire and new student supplement were administered; eligible members of the followback sample were asked to answer with the 1989-90 school year as their point of reference, to maintain comparability with data collected from the main First Follow-Up sample.

5.3 **Data Collection Methodology.** Since the need for a followback study of base year excluded eighth graders was not foreseen at the time that the original design for NELS:88 was being put into place, the only information collected on ineligible students was their name, race/ethnicity (Asian, Hispanic, or Other), and reason for ineligibility.

Thus a major challenge of the followback study--conducted from January to March of 1991--was to locate students for whom no locating information was available other than the name of the school in which they were enrolled in the autumn of 1987, when

NELS:88 sampling rosters were collected. Using this information as a starting point, NORC telephone interviewers attempted to trace the excluded student through the eighth grade school. When information was not available from this source, the tenth grade schools to which the excluded student's peers had dispersed were contacted. Other locating resources that would normally be effective in pinpointing the whereabouts of adult populations (for example, credit bureaux and state Departments of Motor Vehicles) were unfortunately not helpful for this population, given that no social security number had been collected for student or parent, and given the youth of the excluded sample. This group also contained a disproportionate number of mobile students (for example, migrants) and students from low-SES families who were less likely to have a telephone or stable address.

In determining eligibility status in 1990, interviewers were instructed to obtain reports from a person with first-hand knowledge of the student. It was not sufficient simply to talk to someone in the school office, or the principal. Interviewers were to approach the special education teacher, the bilingual education or language arts teacher, or other relevant individuals who had first-hand knowledge of the excluded student's academic capacities. This process typically entailed talking to multiple staff members of the school, until the individual best qualified to assess the student's eligibility status was identified.

Criteria for eligibility and ineligibility were consistent with the broad categories used in the base year; however, as in the NAEP 1990 eligibility definitions (see Appendix C), these broad categories were given more precision, so that interviewers could offer more determinate criteria for interpreting the broad requirements of sample eligibility. The revised eligibility criteria employed in the Base Year ineligibles followback appear in Appendix D of this paper.

5.4 **Results.** The base year ineligibles is just concluding and it would be premature to report results at this time. However, when results are reported, there will be several points of interest, including:

the degree of success in finding these base year excluded students,

the proportion who became eligible for the NELS:88 First Follow-Up,

the proportions of those eligible by each ineligibility group (language ineligibles are thought to be most likely to change in eligibility status),

how much reclassification appears to reflect genuine status change; how much revision of prior classifications on the basis of more refined eligibility criteria; and how much simply the variability attendant upon asking the same question twice, for two different groups of evaluators and the proportions of the newly eligible, and of those still ineligible, who are dropouts or stopouts.

6. Implications for Future Studies

In the concluding section of this paper, we examine the implications of the NELS:88 experience with ineligible students for future education longitudinal studies, and make a series of recommendations. First, there are a number of means for further reducing--through special measures--the number of students who can be included in such studies. However, the costs of special efforts--both monetarily and in terms of school and individual burden and cooperation--must be carefully weighed against the added precision, taking into account the prime purposes of the study.

Second, it is desirable to move toward more common eligibility definitions across major national studies, to increase the comparability of their findings. Nevertheless, the different purposes of these studies must also be taken into account. Taking NAEP and NELS:88 as the most obvious example, differences between the two studies argue for common definitions of inclusion in the narrow domain of eligibility for NAEP and NELS:88 test completion, but for a broader NELS:88 eligibility standard for participation at the level of completing the student questionnaire, and for "participation" at the level of being included in the expanded sample of individuals for whom school enrollment data and demographic data are gathered.

Third, the following particular steps should be taken by national education longitudinal studies: (a) define eligibility as inclusively as possible; (b) follow ineligible students to ascertain change in eligibility status over time; (c) gather demographic and school enrollment status, through proxy sources, on both the excluded portion of the student population, and all survey nonparticipants.

Fourth, the strategy of extending population coverage must go hand in hand with efforts to reduce unit and item nonresponse and to improve the quality of responses, since the rare policy-relevant populations most likely to be excluded are also disproportionately affected by measurement error owing to these other factors. These four topics are discussed at length below.

6.1 **Possible Means for Reducing the Proportion of Excluded Students.** Although exclusion of students from the NELS:88 sample is a statistical difficulty, it would be an almost insuperable operational difficulty to include everyone. The principle of exclusion prudently bends a knee to the fact that not everyone is capable of participating in such a study and that the costs of including others through extraordinary measures may prove prohibitive, when measured against the general purposes and statistical standards of the study. Moreover, it would be ethically unconscionable, and futile as an exercise in data collection, to have a non-English proficient student, or an educable mentally retarded student, struggle for eighty-five minutes to attempt to complete a cognitive test that the student simply could not comprehend. It would be imprudent to ask a student who has behavior control problems and cannot concentrate for sustained periods to attend a three-hour survey session with other students. Nor could schools be expected to cooperate with a study that made such demands. Schools are often (and quite rightly) unwilling (and sometimes legally constrained) in the matter of allowing students with certain handicaps or certified reading levels to participate.

For these reasons, High School and Beyond, NELS:88, and the National Assessment of Educational Progress (NAEP) have all systematically excluded certain categories of the school-age population. In general, however, the excluded student problem is

somewhat less acute for studies starting in tenth or twelfth grades than for studies such as NELS:88 and NAEP, that begin with or include pre-high school populations. NAEP, for example, excludes those students who are deemed by the school to be unable to participate owing to: no or severely limited English language proficiency, functional disability, or mental disability (for example, being classified as educable mentally retarded). In its 1988 assessment, NAEP excluded 5.3 percent of eighth graders, 3.7 percent of twelfth graders, and 6.3 percent of fourth graders. These exclusion rates show an increase over 1984 rates (for example, only 3.6 percent of eighth graders were excluded in 1984). NAEP's 1988 eighth grade exclusion rate of 5.3 percent, and the NELS:88 exclusion rate of just under 5.4 percent, are surprisingly close. Although the NELS:88 exclusion rate is not unexpectedly high, one still must ask what further measures might be employed to increase the rate of meaningful participation and to thus increase the power of survey estimates.

The 5.37 percent within-school student exclusion rate slightly understates the proportion of the eighth grade population excluded from NELS:88 (or NAEP) because whole categories of schools are excluded from the sample as well. Specialized schools for the handicapped, for example, are excluded from the sample frame. However, these schools are not always graded, so that within them it is often difficult to assign unambiguous meaning to a concept such as "in the eighth grade." In any event, these populations, consisting of the most severely mentally and physically handicapped, would be extremely difficult or impossible to survey using the NELS:88 instruments. Reform schools and other such institutions also were excluded from the base year school sample, as were Bureau of Indian Affairs schools. Thus, even had there been no excluded students in the base year, certain students would have been excluded nonetheless because their schools would have been deemed ineligible to participate.

With additional funds, the number of excluded students in NELS:88 or like studies could be further reduced by the following means:

* Translation of questionnaire and tests into Spanish, Chinese, Korean, and other languages associated with groups that have a high immigration rate into the United States, or otherwise constitute language minority communities (for example, American Indians).

* Extended survey administration time limits for handicapped and language minority students

* One-on-one oral administration of questionnaires for poor readers and handicapped students

* One-on-one oral administration of questionnaires for NEP and LEP students, using bilingual interviewers (Chinese-English, Vietnamese-English, Spanish-English, and so on).

* Large print versions of the instrument for the visually impaired

Useful as such measures would be, they are costly and would only marginally increase the number of students surveyed. Nor are these measures wholly without difficulty in concept and application. Some who are non-proficient in English lack literacy in their mother-tongue as well; therefore production of multilingual materials does not remove the language barrier for all students in these language groups.

Production of multilingual written materials must be supplemented by one-on-one oral administration to be truly effective. In the case of the student questionnaire, translation into (at least some) other languages is feasible, and although there is a question about possible mode of administration effects on the comparability of data collected, the questionnaire can indeed be readily administered by an interviewer, as is generally the case for survey forms designed for self-administration. Production of valid, truly parallel multilanguage test forms would be an enormous (and staggeringly expensive) undertaking. Moreover, in the case of the cognitive test battery, oral administration of the reading test is not possible, and is at least suspect for the other tests, grounded as they are in visual formats.

Despite costs and obstacles to implementing any of the suggested means to increasing the proportion of students who can be meaningfully surveyed in NELS:88 and like studies, there are reasons for thinking that further investment of resources in this area is justified. One step in this direction is already being taken in the NELS:88 First Follow-Up. Under the sponsorship of OBEMLA, a Spanish-language questionnaire was prepared. Few students in High School and Beyond chose the Spanish-language questionnaire option (36/27,118 1980 sophomores). Nevertheless, one may speculate that the availability of a Spanish translation may influence (in a downward direction) the number of students excluded on language grounds by school coordinators, even if many of the marginally proficient in English students choose the English version in preference. No Spanish language version of the student questionnaire was available for the NELS:88 Base Year (though a Spanish translation of the parent questionnaire was produced). (Also, it is possible that greater numbers of students would utilize a Spanish-language instrument in eighth, sixth, or other earlier grades.)

The fact of a Spanish-language version of the tenth grade student questionnaire in 1990 has changed (for freshened students) the eligibility criteria of the study. In the Base Year, a student who could not complete the questionnaire in English would have been excluded from the sample. In the First Follow-Up, a student who cannot complete the questionnaire in English but can do so in Spanish will be included. This inconsistency between the eligibility definitions in the Base Year and First Follow-Up can be rectified only in one way. Students who were excluded in the Base Year but who would have been eligible under the liberalized (= can complete a Spanish-language student questionnaire) eligibility criteria of the First Follow-Up should be given a new chance of selection into the sample. This can be done as part of the followback study of excluded 1988 eighth graders.

6.2. **Eligibility in NAEP, versus eligibility in NELS:88.** In general, we would urge that the major national research studies sponsored by the U.S. Department of Education come as close to a common definition of sample eligibility as possible, and consistently take measures to assess the biasing effects of sample exclusion.

However, each study has a somewhat different set of purposes and research instruments, and NELS:88 must maintain historical comparability in earlier cohorts also.[3] While it is desirable for NAEP and NELS:88 to adopt eligibility definitions that

[3]Some flexibility here comes from the capacity to flag special populations and combine and recombine NELS:88 populations for purposes of specific comparisons. Hence one might broaden eligibility criteria, yet maintain

are highly similar, it nevertheless may be desirable for NAEP to maintain a somewhat more exclusive eligibility definition. This is the case because it is commonly felt that there are some students who should not be cognitively tested, but are marginally capable of completing a survey form such as a student questionnaire (or who can complete a questionnaire with special assistance). Also, we argue below (in 6.3) that studies such as NELS:88 should, for certain purposes (for example, production of national dropout statistics) adopt an additional (broader) definition of eligibility and participation, that allows for proxy reports about students who cannot complete the survey forms. Nonetheless, NAEP and NELS:88 should ideally have the same eligibility criteria for completing cognitive tests.[4]

6.3 **Retaining Excluded Students in a Longitudinal Sample.** In general, the best procedure for dealing with ineligible students in education longitudinal studies would appear to be to gather, from their schools and other source, information about school enrollment status, demographic characteristics, and specific handicaps. Such students should continue to be followed. Particularly for those students with an initial language barrier to participation, it is to be expected that their eligibility status may change over time. Eligibility should be reassessed with each wave, and those excluded students who become capable of completing the instruments at a later time should be inducted into the sample.

A direction that we have at least moved toward in NELS:88, which represents a departure from HS&B, is to acknowledge survey "participation" at two levels. The traditional definition of participation is completion of the student questionnaire (minimum case), or the student questionnaire and the cognitive test battery (maximum case). Nonrespondents--those for whom there is no completed questionnaire--receive no final (nonresponse-adjusted) weight and do not appear on the final data file.

However, an alternative approach is to acknowledge a second level of presence in the study, based on whether school enrollment status information can be obtained. Particularly for generation of school retention and dropout statistics, and in order to statistically accommodate both students who are incapable of participation in the sense of test and questionnaire completion and students who are capable but did not participate, one should attempt through the school or other proxy sources to obtain basic demographic and school persistence data for nonparticipants and ineligibles. A special weight can they be created to reflect this expanded definition of the participating survey population.

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consistency, so long as those students who enter the sample through changed criteria can be removed from cross-cohort (HS&B, NLS-72) comparisons.

[4]Commonality of eligibility rules for cognitive test-taking would facilitate cross-walks between NAEP and NELS:88 scales in mathematics and potentially other subjects. While there are additional issues of comparability of the student samples to be resolved if NAEP scales are to be implemented in NELS:88, there is no doubt but that a common test eligibility definition would make NAEP-NELS:88 equating easier to achieve.

6.4 Concluding Postscript: Relating Undercoverage to Other Sources of Measurement Error. Students who are most likely to be excluded (language minority, especially Hispanic; blacks; and particularly black and Hispanic males) are of considerable policy interest. Nevertheless, even the members of these subgroups who are included are more likely to be survey nonparticipants, are less likely to respond to individual items, and are less likely to give valid and reliable reports. In the NELS:88 Base Year, male, Asian, and Hispanic students tended disproportionately to be nonrespondents, as contrasted to female sample members and non-Asian or Hispanic sample members (Ingels, Rizzo, and Rasinski, 1989, p.11). (Whites, blacks, and American Indians were not differentiated on the sampling rosters; all three groups fall into the non-Asian non-Hispanic "Other" category.) In HS&B, unit (and item) nonresponse has consistently been higher for blacks and Hispanics, and for males.

Among participating NELS:88 eighth graders, males were significantly more likely to be item nonrespondents than were females. Also, blacks had the greatest propensity toward item nonresponse, followed by Hispanics, Asians, and American Indians (Ingels, Rizzo, and Rasinski, 1989, p. 38). In terms of quality of responses, the validity and the percentage of cases matched for most NELS:88 base year family background items was generally lower for blacks and Hispanics than for whites or Asians (Kaufman, Tuma, Rasinski, West, and Lee 1991). In High School and Beyond, (Fetters, Stowe and Owings, 1984) it was found that data quality (as measured by validity coefficients) was higher for females than for males, and that white students provided better quality data than did black or Hispanic students.

These findings suggest a chain of compounding biases. Students who are most likely to be excluded typically fall into demographic subclasses in which even the eligible students participate at a below-average rate. Those who do participate, however, are likely to have a higher rate of item nonresponse. Finally, the quality of the data provided is likely to be lower than average. The measurement accuracy that is required to support scientific policy analysis and basic educational research is jeopardized to the extent that undercoverage and nonresponse issues are not addressed. While the first step in this process is to extend population coverage, efforts must also be made to reduce unit and item nonresponse and to improve the quality of responses, with special attention to the policy-relevant populations least likely to respond or less likely to respond with maximum accuracy.

Bibliography.

Bean, Frank D., and Tienda, Marta. 1987. The Hispanic Population of the United States. New York: Sage.

Fetters, William B.; Stowe, Peter S.; and Owings, Jeffrey A. 1984. Quality of Responses of High School Students to HS&B Questionnaire Items. Washington, D.C.: National Center for Education Statistics.

De La Rosa, Denise, and Maw, Carlyle E. 1990. Hispanic Education: A Statistical Portrait 1990. Washington, D.C.: National Council of La Raza.

Frase, Mary J. Dropout Rates in the United States: 1988. 1989. Washington, D.C.: NCES (Analysis Report 89-609).

Ingels, Steven J.; Rizzo, Louis; Rasinski, Kenneth A. 1989. **"School, Individual, and Item Nonresponse in the National Education Longitudinal Study of 1988 (NELS:88) Base Year Survey."** Paper presented at the annual meeting of the American Educational Research Association, San Francisco, March 1989. ERIC accession no. ED 312-311.

Ingels, Steven J.; Abraham, Sameer Y.; Rasinski, Kenneth A.; Karr, Rosemary; Spencer, Bruce D.; Frankel, Martin F. NELS:88 Base Year Data File User's Manuals: Student (NCES 90-464), Parent (NCES 90-466), Teacher (NCES 90-484), School Administrator (NCES 90-482). Washington, D.C.: National Center for Education Statistics, 1990.

Kaufman, Phillip, and Frase, Mary J. 1990. Dropout Rates in the United States: 1989. Washington, D.C.: National Center for Education Statistics. (NCES 90-659).

Kaufman, Phillip; Tuma, J.; Rasinski, K.A.; West, J.; Lee, R. Forthcoming (1991). Quality of Responses of Eighth-Grade Students in NELS:88. Washington, D.C.: National Center for Education Statistics.

Spencer, Bruce D.; Frankel, Martin R.; Ingels, Steven J.; Rasinski, Kenneth; and Tourangeau, Roger. 1990. NELS:88 Base Year Sample Design Report. Washington, D.C.: National Center for Education Statistics. (NCES 90-463)

APPENDICES:

Appendix A: Sample Freshening--Rationale and Procedures

Appendix B: HS&B 1980 Exclusion Criteria

Appendix C: NAEP 1990 Exclusion Criteria

Appendix D: NELS:88 First Follow-Up, Eligibility Criteria for the Base Year Ineligibles Study

Appendix A: Sample Freshening.

Sample freshening procedures are employed in order to give some chance of selection into the NELS:88 First Follow-Up (1990) and Second Follow-Up (1992) to "out of sequence" students, that is, to 1990 tenth graders and 1992 twelfth graders who were not in the eighth grade in the 1987-88 school year. The specific procedure for sample freshening was devised by Martin R. Frankel as an application of the "half-open interval procedure" for minimizing undercoverage. The half-open interval procedure has previously been applied primarily in the somewhat different context of household surveys to correct for missed dwellings in an area frame (see Yates, 1948; and Kish, 1965). However, the procedure can be adapted to encompass "missed" (that is, not part of the eighth grade cohort because not in eighth grade two years before) tenth grade student populations, so that all portions of the population of tenth graders in 1990 (and twelfth graders in 1992) can be given a chance of selection into the NELS:88 sample. Operationalization of the freshening procedure for the First Follow-Up is as follows:

1. In the fall of 1989, NORC Survey Representatives obtained the complete tenth grade student roster from high schools selected for inclusion in the sample, in order:

    a) to ascertain that students expected to be enrolled are in fact enrolled; and
    b) to perform the student linking operations on each school's roster that form the basis for calculating the selection probabilities for "freshened" cases drawn from the tenth grade rosters.

2. Tenth grade rosters were examined by the Survey Representatives within the school building and each NELS:88 eighth grade selection present on the roster was linked down to the next student (referred to as a "linked" student) on the list.

3. The linked student was "screened" to determine whether he or she was enrolled in the eighth grade in the United States two years earlier. A review of the names of linked students by a school administrator able to consult students' cumulative files was sufficient to make this determination.

4. Students who were eighth graders in this country two years prior are ineligible for the freshened sample. The linking process stops with that ineligible student.

5. Each linked student who was not in the eighth grade in this country two years earlier was selected into the "freshened" sample component. If a linked student was selected, the immediately following student on the list was also considered "linked" to the NELS:88 sample member.

6. Steps 3, 4, and 5 were repeated for each linked student, with the process continuing until a student linked to each NELS:88 eighth grader was determined to be ineligible.

A like procedure will be employed for the NELS:88 Second Follow-Up two years later.

References.

Kish, Leslie. Survey Sampling. 1965. New York: John Wiley.

Yates, F., 1948, "Systematic Sampling," Philosophical Transactions of the Royal Society (A; 241, 345-377).

Appendix B: HS&B BASELINE (1980) INELIGIBILITY CRITERIA

In High School and Beyond, the student sample frame was derived from the eligible school sample. (As in NELS:88, certain types of special schools were excluded.) Within the eligible schools, a sophomore was defined as a student who expected to complete his/her tenth grade course work between April 1, 1980 and August 31, 1980. This was to include those students who might be held back or who might repeat tenth grade, but to exclude students dropping out before administration of the HS&B questionnaire in the spring of 1980.

In HS&B, a senior was defined as a twelfth grade student who expected to complete his/her high school course work between April 1, 1980 and August 31, 1980. This group included students who might repeat the grade, as well as "early completers" if they were to complete their course work during this time period. The twelfth grade cohort, however, was not to include early or late graduates.

NORC asked each selected school to provide a list of its tenth and twelfth grade students, as defined above. All students defined as being eligible for sample selection were included in the sampling frame; conversely, all students defined as ineligible for sample selection were removed from the frame.

Additionally, however, a student was considered ineligible when that student:

- Was a foreign exchange student
- Transferred out of the selected school. (A transfer student was defined as a student who had left the school and whose records were requested for a new school).*
- Died.
- Would be unavailable until after August 31, 1980.
- Was listed on the roster in error.
- Had become a drop-out or lost student since he was selected. Such a student would have to have been out of school for 20 or more consecutive days and was not expected to return.**
- Was physically or mentally unable to participate in the survey. ***

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*Transfers-out were not directly replaced. (However, as in NELS:88, all transfers-in were given a chance of selection into the sample). All other categories above in HS&B base year led to replacement by other students from the roster. (HS&B substituted students for the following cases: dropout, listed in error, language barrier, too ill [mentally, physically], in jail, unavailable entire field period, expelled, and

deceased.) No substitution of students was done in the NELS:88 base year.

**Dropouts meet the 20 consecutive days criterion, are at least 16 years of age, and are not expected to return to school. Lost students are dropouts in all respects except that they are not 16 years of age.

***While this category was used to cover linguistic exclusion also, a Spanish language version of the questionnaire was provided so that students whose primary language competence was in Spanish would not be excluded. However, only 36 sophomores and 8 1980 HS&B seniors elected to complete the instrument in Spanish.

Appendix C: NAEP 1990 exclusion criteria.

NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS
CRITERIA FOR EXCLUDING STUDENT FROM THE ASSESSMENT

THE INTENT IS TO ASSESS ALL SELECTED STUDENTS. THEREFORE, ALL SAMPLED STUDENTS WHO ARE CAPABLE OF PARTICIPATING IN THE ASSESSMENT SHOULD BE ASSESSED

Some students may be incapable of participating meaningfully in the assessment because of limited English proficiency or a physical or mental handicap. The Local Administrator, with the advice of other staff members, may exclude from the assessment only those students who are incapable of taking the assessment because:

- The student is a native speaker of a language other than English and has been enrolled in an English-speaking public school (not including a bilingual education program) for less than two consecutive years;

OR

- The student is a special education student with a Individualized Education Plan (IEP) who is mainstreamed less than 50 percent of the time in academic subjects and the IEP team has determined that the student is unable to be assessed.

Students with limited English proficiency and students with IEP's should be assessed, if in the judgment of school staff, they are capable of taking the assessment. When there is doubt, include the student.

Appendix D: NELS:88 First Follow-Up, Eligibility Criteria for the Base Year Ineligibles Study.

The following instructions for the interpretation of eligibility were given to data collectors for the followback study of excluded 1988 eighth graders:

ELIGIBILITY CRITERIA:

It is the intention of NELS:88 to include all sample members who are capable of meaningful participation in the regular survey under normal survey conditions. Therefore, UNLESS there are severe mental or physical handicaps or language barriers and the sample members are not capable of completing the survey instruments under normal circumstances of survey administration, the student should be considered ELIGIBLE for NELS:88; in cases where there is doubt of eligibility status, the sample member should be considered eligible.

It is extremely important that an individual assessment be made of each prospective sample member's ability to participate. Sample members are NOT to be considered ineligible categorically (for example, by virtue of being a special education student, or LEP student), since some special education students and many limited English-proficient students will be capable of completing the NELS:88 questionnaire or questionnaire and tests. In fact, as long as the sample member is capable of completing the NELS:88 Questionnaire, even if s/he is incapable of completing the NELS:88 Cognitive Test Battery, the sample member should be considered eligible for NELS:88.

Eligibility status will be determined by the school that the sample member attended during the 1989-90 school year (or last attended, in the case of dropouts). A knowledgeable official from this school must determine if a sample member is capable of participating in the regular NELS:88 survey (i.e., a bilingual education/ESL/language arts teacher, or member of an Individualized Education Plan team, or other knowledgeable school staff familiar with the sample member's performance. In order to assist schools in making eligibility determinations, we urge that the following guidelines be followed:

1. **Limited English Proficiency (LEP) and No English Proficiency (NEP) students.**

A non-native speaker of English who has been in an English-language course of study less than two years may be considered ineligible if the school determines that the sample member would not be capable of completing a NELS:88 questionnaire; this study assumes that, normally, sample members who have been enrolled in an English-language course of study for at least two years should be considered eligible for NELS:88.

However, a sample member who is a native speaker of Spanish who is literate in Spanish should be included, even if that student is an NEP. Any native speaker of Spanish should be considered eligible for NELS:88 if s/he is capable of completing either the English language OR the Spanish-language version of the NELS:88 Questionnaire.

2. **Special Education students.**

To be considered a Special Education student, the student should normally have an Individualized Education Plan (IEP). A student with an IEP (or dropout with an IEP before dropping out)--who is not mainstreamed in English/language arts; AND who is judged by the school to NOT be capable of completing the NELS:88 Questionnaire should be considered ineligible for NELS.

To guide schools in making this determination, we recommend that a sample member be judged incapable of completing the NELS:88 Questionnaire if that sample member READ AT A GRADE LEVEL FOUR OR MORE LEVELS BELOW THE TENTH GRADE NORM during the 1989-90 school year in English (or Spanish). This may be determined by looking at school records such as standardized test scores, or, particularly when these are not available, by the judgment of the language arts teacher, IEP team members, or other school staff familiar with the sample member's performance.

3. **Students with behavioral disorders or severe physical impairments.**

A sample member who is not normally subject to testing or surveying by the school, owing to behavior disorders, severe cognitive deficits, or severe physical impairments which do not permit the testing/surveying of the sample member under any but extraordinary conditions, should be considered ineligible for NELS:88.

"Extraordinary conditions" should be defined in relation to departure from normal testing and survey protocols. That is, if the sample member would require oral rather than self-administration of the survey instruments, large print or braille versions of the survey forms, translations other than in Spanish, or other extraordinary special assistance or aids, that sample member should be deemed ineligible for participation in NELS:88.